

5 IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
 APPLICATION FOR LETTERS PATENT

10 BE IT KNOWN THAT I, Lakdas, Nanayakkara, a resident of the State of
Florida and citizen of the United States of America, have invented a certain new
and useful improvement in an Earth Retaining and Geo-Grid Wall System, of
which the following is a specification:

15 BACKGROUND OF THE INVENTION

 The instant application reflects an improvement of my U.S. Patent Nos.
5,222,836 and 5,372,461, both entitled Passive Resistive Retaining Wall
Structure and, as well, is related to my U.S. Patent No. 6,105,330 (2000) entitled
Constructional Components For Use In A Wall System, and above referenced
20 related pending applications. This invention relates to an earth retaining system
and, specifically to structures which facilitate the construction of a retaining wall
using special-purpose building blocks inclusive of those taught in my said U.S.
Patent No. 6,105,330 (2000).

25 It has, in the art, been known to use flexible mechanical soil stabilizing
grids or sheets, occasionally termed geo-grids, in combination with a retaining
block wall system, as is reflected in U.S. Patent No. 4,914,876 (1990) to
Forsberg; No. 5,145,288 (1992) to Borchardt, No. 5,800,097 (1998) to Martin;
No. 6,086,288 (2000) to Ruel et al; and No. 6,443,662 (2002) to Scales et al.

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- 5 Notwithstanding such art, cost-effective and reliable earth retaining wall block system, in combination with geo-grids, has not emerged. The instant invention is therefore directed to a novel, cost-effective, and simple-to-utilize earth retaining wall block system which uses flexible geo-grids or the like.

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SUMMARY OF THE INVENTION

The instant invention relates to an earth retaining wall system, definable with reference to an x,y,z Cartesian coordinate system, for stabilizing an earthen wall, said system comprising a y-axis footing having an x-axis width, said footing embedded within the earth along a y-z plane at a base of an earthen mass to be retained by said system, said footing having a flat xy upper surface thereof; and upon said upper surface of said footing, a retaining wall comprising a multiplicity of courses of constructional blocks, each block thereof defining a generally solid rectangular exterior configuration, an x-axis thereof defining a width axis of said wall, a y-axis thereof defining a segment of a length of said wall, and a z-axis thereof defining a segment of a height of said wall, in which one xz end surface of each block comprises a positive y-axis deep key geometry and each opposing xz end surface thereof comprises a negative y-axis deep key geometry complementally interlockable to a part of a substantially planar xy geo-grid positioned within at least one xy plane between said retaining wall and said earthen mass to be retained, a y-axis edge of said geo-grid rigidly secured between opposing surfaces of y-axis courses of blocks of said retaining wall, in which elements of said grid near to said y-axis edge thereof define x and y axes separations proportioned for complementary interposition between successive z-axis recesses and interlocking blocks of opposing z-axis courses, whereby securing said y-axis edge of said geo-grid is secured between adjacent z-axis courses of blocks of said retaining wall.

5 It is an object of the invention to provide a three-dimensional structure for the stabilization of a mass of earth to be retained to reduce the wall thickness and height necessary to retain a given volume of earth.

 It is another object to provide an earth retaining wall system utilizing geo-
10 grids as well as the mechanical principles of passive resistance.

 It is a further object of the invention to provide a retaining wall system which may be constructed or assembled at the work site from a plurality or modular components.

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 It is a yet further object to provide a simple, economical and effective means of constructing an earth retaining wall from concrete building blocks.

 It is a yet further object to provide an invention of the above type which
20 can readily anchor a block wall to backfill and earth volumes of a variety of sizes and geometries.

 It is a further object to provide a mortarless, self-anchoring retaining system using geo-grids.

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- 5 The above any yet other objects and advantages of the present invention will become apparent from the hereinafter set forth Brief Description of the Drawings, Detailed Description of the Invention and Claims appended herewith.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an isometric view of the inventive system.

Fig. 2 is a side vertical cross-sectional view of the inventive system in an
10 xz plane thereof.

Fig. 3 is a cross-sectional view of the system taken along a xy plane
thereof.

15 Fig. 4 is an enlargement of the retaining wall, shown in Fig. 3, particularly
reflecting the complementary connection between a y-axis edge of a geo-grid and
the blocks of the retaining wall.

Fig. 5 is a vertical cross-sectional view, similar to that of Fig. 2, however
20 showing the use of geo-grids of different x-axis lengths.

Fig. 6 is an isometric view of a constructional block used in the retaining
wall of the instant invention.

25 Figs. 7 and 8 are respective top and bottom plan views of the block of Fig.
6.

- 5 Fig. 9 is a vertical cross-sectional view taken along Line 9-9 of Fig. 6,
- Fig. 10 is a vertical cross-sectional view taken through Line 10-10 of Fig.
- 6.

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DETAILED DESCRIPTION OF THE INVENTION

With reference to the isometric view of Fig. 1, the instant invention may be described with reference to an x,y,z Cartesian coordinate system. Therein, the system may be seen to include a y-axis footing 20 having an x-axis width and a z-axis height, a part of which is embedded within earth 22. An earthen mass 26 is indicated to the right of Fig. 1. Footing 20 includes a flat xy upper surface 28 thereof.

Upon said upper surface of footing 20 is a retaining wall 30 (see also Fig. 2) which comprises a multiplicity of courses 32 of constructional blocks 34, each block thereof defining a generally solid rectangular exterior configuration, an x-axis thereof defining a width axis of said 30, a y-axis thereof defining thereof a segment of a length of said wall, an a z-axis thereof defining a segment of a height of said wall 30.

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As may be noted in Figs. 6 thru 10, one xz end surface 36 comprises a positive y-axis deep key geometry and each opposing xz end surface 38 of block 34 comprises a negative y-axis deep key geometry, complementally interlockable in said positive y-axis deep key geometry 36.

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Further, in a preferred embodiment, blocks 34 will include male members 40 projecting from lower xy surfaces 42 which are complementary to female

5 recesses 44 within upper xy surface 46 of the block. Thereby, z-axis projections
40 will complementally interlock lower ledge 58 to upper ledge 48, thereby
effecting deep key interlocks 36/38 within the y-axis and 40/48 within the z-axis
of the system.

10 Between one or more xy interfaces 50 (see Figs. 2 and 5) are a geo-grids
52 having a y-region having a matrix-like structure (see Figs. 3 and 4) which is
complemental to said projecting male elements 40 of the blocks 34 which form
said courses 30 of the retaining wall. Accordingly, when region 54 of grid 52 is
placed upon xy upper surface 46 of a block 34, z-axis male member 40 of the z-
15 axis abutting block may be placed thereon enabling lower xy surface 42 (see
Figs. 8 to 10) to abut thereagainst, as is shown in Figs. 3 and 4. Accordingly, it
should be understood that constituent matrix elements 60 of geo-grids 52 are, in
the instant invention, proportioned for complemental securement between xy
surfaces 48 and 58 of blocks 34.

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With reference to Fig. 5, there is shown variable x-axis lengths of geo-
grids 52 which may be employed. It should be further understood that grids 52
may include a variety of materials ranging from a flexible polymeric material to a
thin gauge steel rebar.

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5 While there has been shown and described the preferred embodiment of the
instant invention it is to be appreciated that the invention may be embodied
otherwise than is herein specifically shown and described and that, within said
embodiment, certain changes may be made in the form and arrangement of the
parts without departing from the underlying ideas or principles of this invention as
10 set forth in the Claims appended herewith.